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REMARKS ON INSTINCT.

BEING AN INVESTIGATION OF THE VIEW OF IT PROMULGATED BY DR. GOOD

[Communicated to the National Institute for the Promotion of Science, by Samuel Webber, M.D., of Charlestown, N. H., and forwarded for publication in the Boston Med. and Surg. Journal.]

Dr. Good, in his Book of Nature, after briefly examining and rejecting the theories and doctrines of several preceding writers on the subject of Instinct, offers what he deems a new view of it, and which he thinks "will give a more definite idea of the nature of the action, and consequently of the extent and real meaning of the term." Later writers have appeared generally to adopt Dr. Good's ideas of the subject, though I am not aware that it has been particularly discussed recently.

In this new view, instinct is assigned to all organized bodies possessing life, and is explained as denoting the agency of the principle of life, whatever that may be, whereby all such bodies grow, and are preserved in health, and re-produce their species. It is stated to be "the common property of organized matter, as gravitation is of the unorganized mass." Sensation and perception, the latter being considered as the outline of reason, are distinct powers or faculties, likewise belonging to organized matter, but only to certain forms of it.

This is indeed a new view of the subject, but instead of giving a more definite idea of the extent and meaning of the term, it seems likely to destroy its peculiar signification altogether—to make it, in fact, a vague term, so general in its expression as to convey to the mind no distinct idea whatever, since, according to it, to say that a thing is the result of instinct, is but to say that it is the result of the agency of the living principle—that it is done because the thing that did it is alive, and in order that it may grow, flourish or reproduce its kind. As, however, growth, vigor and reproduction are the essential fulfilments of perfect life, to say that a thing is the result of instinct, amounts merely to saying, that it is done because the thing that does it is a living body; and again, as action in an organized body implies life, the phrase may be resolved into this, that it is done because the thing that does it is an organized body—a statement agreeing perfectly with the assertion that instinct is the common property of organized matters, but conveying to us no information as to its nature.

The manner in which a brood of young ducklings, hatched by a hen, will take to the water, is ascribed in the usual use of the term to instinct, and to the same cause is referred the alarm and uneasiness of the supposed mother, when this takes place. How will it sound, however, to say that the ducklings take to the water because they are organized bodies, and the hen is frightened thereat because she is an organized body? or even that the deed on one side and the alarm on the other is occasioned by the agency of the principle of life—that principle by which all organized bodies grow, are preserved in health, and reproduce their kind? No distinct or definite idea whatever is conveyed by such an assignment of cause; it would be vastly more to the purpose to say, that the ducklings take to the water, because ducks are fond of water; and that their supposititious mother is frightened, because, being a hen, she does not like water. Here we should have, by way of a reason, the assignment of two general facts ascertained by repeated observation.

It is not, however, the fact, that, when it is said, that either of the above-cited occurrences takes place from instinct, no more definite idea is conveyed to the mind, than seems to be the case when Dr. Good's definition of instinct is used in the room of the term itself. It would be readily explained by any person at all acquainted with the subject, or with the ordinary use of language, that when it was said that the ducklings took to the water from instinct, it was meant that they did so from an intuitive knowledge that the element was one in which they were fitted to move and to seek their food in part—in consequence of an impulse or desire arising out of their nature, and independent of any experience, and that from the same impulse, when once committed to the water, they immediately made the proper use of their limbs for the purpose of moving themselves in any desired direction, and in the manner best adapted to this purpose, with a view to which their bodily structure was fashioned; and finally, that all the movements so employed were performed by volition acting upon the organs performing them.

In like manner, with regard to the hen. When her alarm and the manifestations of it are referred to instinct, the idea conveyed is, that, supposing the young brood to be her own proper offspring, she is frightened and distressed at seeing them plunge into an element for which she intuitively knows chickens are not fitted, and in which they are in danger; and that from a natural impulse arising from this knowledge, she exhibits the various signs of distress suited to the occasion, and makes the usual calls to bring them to her side, notwithstanding that, if she possessed reason, she might perceive that they were moving about in ease, safety and enjoyment—and finally, that her movements are also performed by the organs obedient to volition, and acting in consequence of its exertion.

From this explanation of the idea conveyed by the use of the word *instinct* in the above cases, it may be deduced, that the term embraces the following elements, viz., intuitive knowledge, volition to act, untaught skill in the use of the voluntary organs in obedience to the volition, and an impulse or desire arising out of the knowledge, and inciting the volition to put the voluntary organs in action. It is but limited to the supply of natural wants, the gratification of animal passions, and to the avoidance of danger, and to but a few modes of these in animals, in consequence of the formation of the voluntary organs; but so far as its action extends, it is a substitute for the acquired knowledge, the inventive powers and disciplined skill of the human race.

Such, then, is instinct as developed in the instances above cited; and this statement is perfectly in harmony with the definitions given in the best dictionaries explaining the ordinary meaning of language Johnson gives to instinct the following signification. "*Desire or aversion in the mind, without the intervention of reason or deliberation.* The power of determining the will of brutes." The Dictionary of the French Academy calls it, "*a sentiment, a movement independent of reflection, which nature has given to animals in order that they may know and seek what is good for them, and avoid what is hurtful.*" In another dictionary in common use, instinct is said to be "*that faculty in brutes which supplies the place of reason in man.*"

Even in works of a more didactic class the same idea in substance is given. Thus in Rees's Encyclopædia it is said that "*Instinct is a natural disposition or sagacity, wherewith animals are endowed, and by virtue whereof they are enabled to provide for themselves, and know what is good for them, and are determined to preserve and propagate their species.*" Webster quotes some other Encyclopædia for the following. "*A certain power or disposition of mind, by which, independent of all instruction or experience, without deliberation, and without having any end in view, animals are decided unerringly to do spontaneously whatever is necessary for the preservation of the individual, or the continuation of the kind.*"

These different definitions, derived from sources of high authority, and agreeing well with each other in their essential elements, seem to show that the general practical application and understanding of the term were sufficiently well known. Philosophers have differed among themselves with regard to the intimate nature of the faculty, with regard to its precise extent in the vast range of the animal creation, embracing at one extremity beings endowed with the highest faculties of mind, and at the other those that can hardly be considered more than sentient; and finally they have differed as to its manner of inciting action, and as to what actions are incited by it in extreme cases. These differences have been fruitful themes of discussion, and, notwithstanding the labors of many brilliant and profound minds, seem likely to remain such; since on these points the very nature of the subject throws a mystery, that no keenness of merely human faculties seems likely to penetrate, and that no force of merely human reasoning can probably dissipate.

Dr. Good's new view of the subject does not really offer the least advancement towards a settlement of these difficulties; it affords no more definite idea of the nature of the action embraced within the analysis and definitions just given; nor does it give any more distinct notion of the extent and meaning of the term as employed to designate that action. He simply takes the term, and neglecting all the signification attached to it by long-established usage, save that it expresses a cause, other than reason, of the actions of living bodies, applies it boldly at once as the cause of all actions not proceeding from reason, not only in all living bodies, but in all of the separate systems that constitute living bodies, and even as the cause of the local action of a part of any one system of these, or of any number of such parts. Meanwhile the peculiar faculty, to which the term was before applied, is left without any distinctive appellation, and the disputes and various opinions concerning its nature and extent are just where they were, or, in fact, so far as the new view is received, the whole subject is more darkened than before; since by the arbitrary introduction of a very different signification of the term, persons may use it in discussion without all attaching anything like the same meaning to it, and thus be farther than ever from understanding each other, and consequently from being convinced by argument or enlightened by each others' remarks.

In short, Dr. Good's proposition seems to be nothing but a wanton innovation on the use of language sanctioned by long custom, and the more so, as the new application of the term does not supply any deficiency of expressions, but merely crowds out one already in use, leaving, at the same time, a gap in its own place; since there appears to be no appreciable difference between the "agency of the principle of life" and the old "*vis vitæ*," *vital power*, or, as it might perhaps be better translated for exactness of expression, *vital impulse*. This *vis vitæ*, or vital impulse, it is, which is the common law of all organized bodies in a living state, and which is the foundation of all other laws, as attraction, not *gravitation*, is the common law of all unorganized bodies, and the foundation of their other laws.

Language, especially in the extent and application of its scientific and philosophical terms of a general character, is already too indefinite, and any great change in the meaning assigned to them, should not be made but with extreme caution, and only for the sake of supplying some great deficiency, or gaining some marked addition of clearness or force. A change, therefore, like that which has been commented upon, appears to be deserving of much censure.

It would not be difficult to dispute the claim to originality of this *new view*, except, perhaps, in the statement of it, since various writers on the subject have at different times, through a loose use of language, or unsettled ideas, made the term cover as much ground as is assigned to it by Dr. Good, perhaps even more. Thus Darwin attributed instinct to vegetables, and made it in them the spring of organic actions; and Smellie seemed to consider the *exercise of reason* as arising from instinct. It is not, however, the intention of this essay to discuss any such claim, but merely to show, that the view is an incorrect one, and to exhibit an arrangement of the subject more agreeable to the long-established use of terms.

It is not pretended in the following remarks to offer anything particularly novel on the subject, perhaps nothing new will be offered, but merely to set if possible in a clearer light, ideas already well known, and to disentangle some of the confusion unnecessarily brought into the subject by loose thinking and still looser writing. If the broad masses of the different divisions of the subject can be made distinct, something will be done without attempting to define perfectly their outlines, since, like the other works of nature, the divisions, as their limits approach each other, become more alike and less distinctly marked, till like the dim line of a distant horizon the exact boundary is hardly to be traced.

The general notion and elementary principles of instinct in its perfect form, as established by good usage and high authority, have already been given. The farther development will be reserved for another place. It has also been stated that the meaning assigned to it by Dr. Good, is that denoted by a term already in established use, namely, the *vis vitæ*, meaning the power, impulse, or action of something denominated the principle of life, or, simply, life. This vital power is characterized by Richerand, as "making the total of the powers that animate living bodies, and distinguishing them from inert matter"; as "in living bodies, a force which maintains the harmony of their functions, and directs them all to a common end, the preservation of individuals and the species"; as being to the philosophy of living beings, what attraction is to astronomy; as "the *vis medicatrix naturæ*," &c. All these characteristics, Dr. Good assigns to instinct, in his new view of it.

Of the various renderings given to the term *vis vitæ*, that of vital energy or vital impulse seems the best, as denoting most distinctly the agency of the principle of life. As *attraction*, the great law of inorganic matter, is divided into the peculiar laws called the *attraction of gravitation*, the *attraction of cohesion*, and the *attraction of affinity*, or simply gravitation, cohesion and affinity, so the vital energy or impulse may likewise be divided into various particular laws, constituting so many orders of impulse, each, like the different kinds of attraction, less general than the proceding. The arrangement that appears on the whole the most convenient, is that which makes the divisions as follows, viz.: the impulse of formation, or organic impulse; the impulse of mere mind, animal impulse or instinct; and the impulse of intellect and thought, or rational impulse. The propriety of the last of these classes may yet be somewhat of a doubtful point, but some plausible reasons may be produced in favor of such a division; some of these will presently be offered.

The impulse of formation, or organic impulse, is that general division of the agency of the living principle, which incites and directs the growth of all living bodies, giving to each kind and species its peculiar and characteristic form and external appearance, and to individuals their different varieties of the same. It likewise incites and directs the operations of all the organs whereby these bodies, after their growth is completed, are preserved essentially the same, in a state of greater or less vigor, till the departure of life, which is but the cessation of this agency or impulse and the abandonment of the organized body, formed and preserved by it, to the action of the various laws of attraction which govern inorganic matter, and between which and the laws of the living principle there seems to be a constant opposition, though the former during life are in a certain degree of subserviency to the latter, and in fact constitute the instruments by which its purposes are effected.

To the dominion of this impulse belong the functions of digestion, absorption, circulation, respiration, secretion, excretion, exhalation and generation—all, except excretion and exhalation, carried on by a distinct system of organs. There is a particular modification of this impulse which is employed in repairing some injury suffered by a portion of the living body. This is what has usually been termed the *vis medicatrix naturæ*, the healing energy of nature, but which might well be termed the reparative impulse. It must be considered a modification of the impulse of formation, because its processes are performed by the organs belonging to the functions above named, and are but the altered or modified action of these functions: while still it is distinguished from the general organic impulse in some particulars. One of these seems to be the presence of irritation, considered simply as a cause, disturbing the ordinary action of the impulse, and the performance of the functions, so that they do not produce the same results as in the natural state.

Another point of distinction is, that the reparative impulse does not belong in the same extent to the different classes or orders of organized bodies, but is found greater in those of a simple organization than in those which have one more complicated. It belongs to the lower classes of vegetables generally, more than to those of a higher class, to most vegetables more than to any but the very lowest classes of animals, and to these far more than to the higher. This difference, moreover, exists not only in the physical extent, but in the nature of the reparation. Whole trees of a certain species may be reproduced from a twig not containing a hundred thousandth part of their substance; if some of the polypus tribe be cut into half a dozen pieces, each piece will become a perfect individual; if an earth worm be cut in two, each half will reproduce its deficient portion; a lobster that has lost its claw, has its place supplied by a new one perfect in all respects. But in the higher order of animals, not only is no lost member, or whole portion of a member, replaced, but even the loss of any portion of skin, muscle, or other texture, except the epidermis and its appendages, is not replaced, so that the part shall be exactly what it was before, but the vacancy is filled with what may be considered a substitute, matter for the most part of a less perfect organization.

Besides this, there is a difference among the different classes as to the general or specific nature of the reparation. If a tree push out a shoot or a number of shoots in the room of a branch that has been cut off, no one will occupy the same site as that branch, or particularly resemble it in shape, elevation, extent, &c., and yet will be, to all intents and purposes, as perfect a limb as that which was lost; but if a lobster lose a claw, it will be replaced by another claw having a similarity in shape and other respects to the one lost, and two claws will not come to supply the place of one.

It may be doubted, however, whether all the processes that take place from the receipt of an injury to the time of its reparation, and which are usually ranked among the effects of the *vis medicatrix*, are in reality of a sanative character, since they may be ascribed merely to a vitiated performance of the functions by the parts injured, under the influence of the irritation occasioned by the injury. When this irritation subsides, the functions are restored to healthy action, and by the continuance of this gradually complete the reparation.

This idea derives weight from the consideration, that formations take place, the tendency of which seems to be the ultimate destruction of the living principle, by the agency of the organs of which they are formed. This is the case with many classes of tumors and other morbid growths; and though these may be formed by the agency of the living principle, yet the general tendency of that action must be considered as overcome and misdirected by some other influence. If the effect of this influence be but partial and of temporary duration, the energy of the living principle resuming its proper sway, will impel the organs to the performance of their usual healthy and conservative action. A light inflammation terminates in resolution; one considerably more grave, suppurates. It does not appear from this that suppuration is necessary to the recovery of the affected part, but merely that suppuration is the result of more grave and persistent irritation than happened in the first instance. A case much more severe may terminate in gangrene, without the intervention of suppuration. The series of local actions that terminate in gangrene, cannot fairly be attributed to the proper agency of the principle of life, but merely to that agency vitiated, misdirected and overcome by some other cause, which, generally speaking, may be called irritation. Now, though in many cases suppuration is a comparatively healthy action, if put in contrast with gangrene, yet it does not follow that it is positively so, but merely an action less vitiated, but more so than in the case of termination by resolution. In some cases, it is true, suppuration has its benefit, as in loosening any mechanical cause of irritation driven into the flesh, and thus contributing to its removal; and in all cases it may be possible that it affords a vent for some irritative cause, thereby ultimately removing its action. Still this agency cannot but be considered indirect, as a bringing of good out of evil, or what is seemingly so.

If this view be correct, those actions which are the effects of irritation, whether indirectly beneficial, or of a wholly destructive tendency, as in the formation of scirrhus and other fatal morbid growths, should be considered as forming a class by themselves, being neither the result of the proper impulse of formation, nor of its reparative modification. They may be looked upon simply as vitiated actions, or, if it be deemed advisable to assign any variety of impulse for their classification, a fitting name may be found in the term Irritative Impulse. The whole of the laws of formation will then come under the head of *Organic Impulse*, with the subdivisions *Primitive*, *Reparative* and *Irritative Impulse*.

It seems to be a law of vital impulse, that though standing ready to act, its agency cannot begin without the fulfilment of conditions, such as the concurrence of certain circumstances, or the presence and application of certain agents which may serve as stimuli, or incitements to the living principle. This is more manifest in no case than in that of the organic impulse. Although this comprises the first incipient efforts of growth and formation, what Blumenbach calls the ***nisus formations***, in the organized rudiment of any being, such, for instance, as the seed of a plant, and directs its growth and action to the complete and perfect formation of seeds, that are the organized rudiments of future plants, yet it cannot begin the first effort in the individual, but by the incitement of warmth and moisture, and, in general, something to serve as a fit place of deposit for the seed, where these incitements may be supplied in the proper degree and manner. After the growth has begun, other elements more or less numerous come into requisition for the healthy and natural continuance of it, according to the nature of the plant, and as the supply of these is best, both in quantity and in quality, so proportionally is the vigor and growth of the plant. Owing to deviations from the proper and equal supply of these elements to different portions of the same plant, many deviations from the usual course of its growth take place, giving the appearance of the seeking or avoiding of certain things, which probably was the first occasion of the assignment of ***instinct*** to plants, and of the confusion thus made by some in the use and understanding of the term, and which gradually led to Dr. Good's "new view" of the subject.

As plants can hardly be pretended to have volition or voluntary organs, such persons were forced to make instinct supply the place of volition, and to give it cortrol over the organic organs; and as even then it would be of little use without perception, they made it supply the place of perception also, if indeed they did not attribute perception to it. Thus they accounted for these deviations from regularity of growth, and thus widened the limits of instinct till they coincided with organic impulse, or the ***vis vitæ***, and brought about Dr. Good's definition of it. An instance or two will be given from those cited by Dr Good as illustrations of instinct. He says,

"A strawberry offset planted in a patch of sand will send forth almost the whole of its runners in the direction in which the proper soil lies nearest, and few and sometimes none in the line in which it lies most remote."

The offset here spoken of probably at first pushes out its roots in all directions under the agency of organic impulse; those on the side nearest to the fertile soil undoubtedly meet with the most abundant supply of nutriment from the diffusion of moisture and other nutritious substances from that soil into the sand, the quantity of these constantly becoming less with the increase of distance from the soil. Hence the roots on the nearest side grow larger, longer, and become more numerous, and supply a proportionate share of nourishment to the plant, and from the nature of the vascular system of plants this larger share of nourishment will be imparted to the same side of the plant; hence the germs of shoots and runners on that side will be incited with greater stimulus and in greater number, and their growth will be more vigorous than on the other side where the nourishment is less abundant. The difference will be in proportion to the amount of nourishment on the respective sides more than is merely sufficient to maintain the life of the plant, and thus there may be few or none on one side, and many on the other. As the direction of these runners is from the centre outward, they will naturally take the direction of the fertile soil, and thus propagate the plant in the line best adapted for its flourishing, but without any seeking after it, or any process which can be likened to the instinct of animals, though as far as regards the welfare of the individual, and the preservation of the species, the results may be the same as are effected in animals by instinct.

Again. "When a tree that requires much moisture (says Mr. Knight) has sprung up or been planted in a dry soil in the vicinity of water, it has been observed, that much the larger portion of its roots have been directed towards the water; and that when a tree of a different species, and which requires a dry soil, has been placed in a similar situation, it has appeared, in the direction given to its roots, to have avoided the water and moist soil."

The explanation of these two instances seems abundantly obvious after what has been before said. The roots in each case grew most vigorously precisely in the direction in which the greatest quantity of suitable nourishment was supplied to them, and because it was so supplied. There was no seeking after the water in the one case, nor avoiding of it in the other.

"When a tree (remarks Dr. Smith) happens to grow from seed in a wall (and he particularly alludes to an ash in which the fact actually occurred), it has been observed, on arriving at a certain size, to stop for a while, and send down a root to the ground. As soon as this root was established in the soil, the tree continued increasing to a large magnitude." This, at first sight, seems a stronger case in support of the opinion it is brought to illustrate, than the preceding, yet the explanation of it is not very difficult. The tree continued to grow so long as its roots, in conjunction with the absorption of the leaves, could supply it with sufficient nourishment. After a while the supply of moisture and of that portion of matter furnished by the earth ceased to be enough to prolong its upward growth, while the returning sap, rich with its accession of carbon and moisture derived from the atmosphere through the leaves, was still capable of affording to the roots the means of growth. Some root, more favorably situated than the rest for obtaining the benefit of this supply, continued to grow with vigor, till having reached the ground where nourishment was abundant, it threw out its fibres in all directions, and soon acquired a bulk and vigor that enabled it to convey to the tree materials for a new, permanent, and thrifty growth. The tree did not stop, that it might direct its energies to the root, and send that down to the ground, knowing that thence it might obtain a better supply of food. It stopped merely for want of materials wherewith to grow, and the root in question grew, as it would in any case, because it had the materials for its growth, and it grew towards the ground, in obedience to the peculiar action of its primitive law of organization, the vital impulse, which, as was before stated, determines in each kind of plant, its peculiar shape, and the general shape and direction of its parts, as they proceed from the original germ.

There seems, in the manner in which these instances are brought forward, to be a shifting of the relative position of cause and effect, as may, perhaps, be the case in the following farther instance.

"The best means, perhaps, that a plant can possess of resisting the effects of drought, is a tuberous or bulbous root. The grass called Phleum pratense, or common cats-tail, when growing in pastures that are uniformly moist, has a fibrous root, for it is locally supplied with a sufficiency of water; but in dry situations, or such as are only occasionally wet, its root acquires a bulbous form, and thus *instinctively* accommodates the plant with a natural reservoir; and there are various other grasses, as the Alopecurus geniculatus, that exhibit the same curious adaptation."

The above instance is given on the authority, again, of Dr. Smith, whose high rank as a botanist must readily be allowed, yet the precise accuracy of the statement, particularly as to the impression it seems intended to make, may admit of question. Why may not the two forms of the plants above mentioned be two distinct species? Many species among plants of the same genus are distinguished by quite as small differences as that between a bulbous root and a fibrous one. The only thing that would show that they are not so, is the ascertaining by experiment that they are convertible into each other; that is, that a fibrous-rooted cats-tail, by being removed to a dry soil, will become bulbous-rooted, and the converse; or that the seeds of either kind will produce plants of each kind, being sown in two different appropriate soils. If they be not convertible thus, the whole original position falls to the ground. If they be, then each kind must contain the same rudiments of formation, and the difference of their development in the two must be according to their supply of the proper incitements or materials of such development.

Suppose the bulbous root to be the primitive form. Bulbs have fibrous roots proceeding from their bottoms, whereby they are nourished. In a moist soil, in the cases above, the proper nourishment, either in quantity or quality, is not supplied for the development of the bulbous organization, and it remains abortive; while the fibrous roots, finding abundance of suitable nourishment for themselves, and the other parts of the plant above the bulb, grow and flourish with these parts, and the grass, taken as a whole, appears to have a fibrous root merely. If, on the contrary, the fibrous root be supposed to be the primitive, still, if the species be identical, it must contain the rudiments of the bulb, though in the proper soils it must be what is termed abortive. In a different soil from that natural to it, are found the incitements of particular nourishment, warmth, dryness, &c., that are suited to rouse into action, under the vital impulse, these naturally abortive rudiments, and the bulb becomes developed, the fibrous roots remaining attached to it in their relative proper situation, but with a difference of development, owing to the change in the other rudiments, and to the difference in the quantity and quality of the nourishment they receive. Here is nothing that ought to be referred to instinct properly so called, and the whole illustration is a failure.

By similar processes of examination, as far as the present amount of knowledge in these matters will permit them to be made, it is most likely that all the suppositions of instinct in vegetables, answering in any degree to that faculty in animals, will be explained in perfect accordance with the principle that has been laid down, that all the actions of vegetable life are owing to the agency of the principle of life under the division termed organic impulse, and the coincidence of particular incitements modifying the action of that impulse.

(To be concluded next week.)

CASE OF POISONING BY HYDROCYANIC ACID.

On the evening of the 23d of January, I was summoned to the aid of Mr. H——, a medical gentleman of Stratton, near Cirencester, who was reported to have poisoned himself. I found him lying on his back on the hearth-rug, his head supported by a folded shawl. His countenance was placid, and free from all contortions, his eyes closed, and the pupils not largely dilated ; a fresh healthy color was on his cheeks. His limbs were quite supple, and his body warm. Life had been extinct about ten minutes. From the statement made to me in the room, and which afterwards appeared in evidence at the inquest, I learnt that he had returned home from a long round of visiting, much fatigued, and feeling a pain in his chest, took the bottle of acid from its place in the surgery, and went into the parlor adjoining, for the purpose of taking a minim dose to relieve it—a remedy he had more than once had recourse to before, for the same purpose. While there he was heard to stagger, and as the house-keeper rushed into the room, he fell, and an ounce phial, about half full of hydrocyanic acid, of Scheele's strength, corked, dropped from his hand. She rang the bell violently, and gave the alarm, and in five minutes his brother, who is a medical man, was on the spot. He was then breathing, and his pulse was distinctly perceptible at the wrist. Notwithstanding every means tried to counteract the effects of the poison, he expired in a few minutes without any scream, and quite tranquilly.

Appearances, twenty-two Hours after Death.—Weather very cold. The body was cold and rigid. All the depending parts, as the back, shoulders, bend of elbows, &c., were of a mottled purplish color. On opening the chest, the right lung presented a dark, dusky purple appearance, was not much collapsed, and contained air. On being cut into, a frothy, dirty-brown, semi-mucous fluid exuded, tinged with blood. There was no odor of prussic acid from it. In the cavity of the right pleura were about eight ounces of thin serum ; the surface of the pleura was not marked by any evidence of inflammation. The left lung was of a pale color, exsanguine, contained but little air, and poured out only a whitish frothy mucus on being cut into ; it was firmly adherent in its whole extent to the costal pleura of the same side, and, posteriorly, the adhesions were so strong as to defy my strength to separate them. The pericardium was natural ; it contained, perhaps, a little more fluid than usual in its cavity. The heart was small, and firmly contracted, and the vessels on its surface distended with fluid blood. On cutting into it, about three ounces of dark-colored fluid blood trickled out, without the least appearance of coagulation having been attempted. It exhaled no smell of prussic acid. The parietes of the ventricles were a little thicker than usual. The liver was large and healthy. The spleen soft and easily broken down, resembling mulberry jam. The kidneys were firm, rather large, and slightly coagulated. The stomach contained about fifteen ounces of half-digested food, that gave out the peculiar smell of food undergoing digestion, with which also could be satisfactorily recognized the well-known odor of bitter almonds. The mucous coat of the stomach was healthy, and smelt strongly of prussic acid after the stomach had been emptied of its contents. The intestines were healthy. The brain and its coverings were healthy, but its vessels and its sinuses were filled with dark-colored fluid blood. It was quite free from any smell of prussic acid.

In this case, first, he had power to cork the bottle after having taken the poison; indicating its paralyzing effects on the sensorium not to have been instantaneous. Second, the placid state of his features, unmarked by any act of expiring. Third, there was no scream, but he died tranquilly and silently. Fourth, the congested state of the right lung might more reasonably be referred to the effects of chronic pneumonia than to the poison. Fifth, the blood was everywhere dark colored and fluid. Sixth, the odor of bitter almonds was satisfactorily recognized in the stomach, and nowhere else. Seventh, he lived nearly ten minutes after having taken the poison.—Mr. Pooley, in *London Medical Gazette.*

DIGESTION OF VEGETABLE ALBUMEN AND FAT.

By R. D. Thomson, M.D., Lecturer on Practical Chemistry in the University of Glasgow.

Nearly three years ago, Dr. A. Buchanan communicated to me the fact, that he had frequently observed the serum of the blood to present a white appearance when a person happened to have been bled for some affection of such a circumscribed nature as not to interfere with the appetite or digestion; but an opportunity did not occur to me of examining this peculiar serum till the end of 1843, when Dr. Buchanan was so kind as to place some of it at my disposal. The fluid presented the appearance of thin milk, being covered, after standing, on the upper surface with a whitish scum of a denser character than that which was diffused through the fluid. When the fluid was filtered, a portion of the scum remained on the filter while the liquid passed through, possessing still a milky aspect, but obviously being deprived of a considerable portion of its denser particles. Dr. Buchanan, however, observed that this white matter might be accumulated in larger quantities, or at least collected into smaller bulk, by saturating the serum with common salt, when the white matter speedily rose to the surface in the form of a creamy layer, which did not change its physical character even when kept for months. I found that the white matter, both when separated simply by the filter and also when precipitated, if we may so speak, by common salt, contained a substance which was insoluble in æther and alcohol, and that when dissolved in caustic potash, and the solution was boiled with acetate of lead, a black precipitate of sulphuret of lead fell. These experiments were several times repeated carefully with the same result, and were witnessed by Dr. Buchanan, so that we had no doubt in our own minds that the presence of traces of an albuminous substance in the white matter of this serum was established; and we had, subsequently, opportunities of obtaining this matter in larger quantities, so as to confirm the previous experiments.

These results led to a series of researches upon the effect of food on animals, and also on man; from which it was clearly demonstrated that the white color of the serum in healthy animals is dependent on the introduction of food into the system. The detail of one or experiments will place this conclusion in a distinct point of view. It was necessary for this purpose to observe the characters of the serum of an individual who had not tasted food for such a space of time, that the effects of the previous meal should have disappeared. On the 10th of March, 1844, from a stout young man, aged 30, who had tasted no food from the preceding evening at six o'clock P. M., two ounces of blood were taken at noon, or at an interval of eighteen hours after a meal. The blood coagulated, on standing, in the usual manner, and the supernatant serum was found to possess a pale-yellow color, and to be perfectly clear and limpid.

After the abstraction of the blood, the individual dined upon twenty-four ounces of a pudding consisting of two parts of wheat and flour and one part of suet, seasoned with salt. At three o'clock, or in about three hours after the food had been swallowed, seven ounces of blood were taken by venesection from the arm. The clot formed as usual, no appearance of a buffy coat presenting itself. The serum was whitish and opaque; when heated, it became more translucent, apparently from the solution of some of the solid particles diffused through it, or, as was afterwards apparent, from the liquefaction of the fatty matter diffused through the serum. The whole fluid possessed a somewhat syrupy cast of appearance, and was very heavy, its specific gravity being as high as 1029.8. Comparing this density with the average density of serum, as we find it in physiological works, 1026½ by Dr. Thomson, 1027 to 1029 by Muller, it must be pronounced high; but as the specific gravity of this fluid has never been properly estimated in perhaps the truly healthy condition of animals, and more especially in parallel cases with that described, no conclusion can be deduced in reference to the density of the serum as compared with the normal standard. On throwing the serum upon a filter, a portion of white matter remained attached to its interior surface, while the liquid which passed through retained still a milky aspect; but perhaps the most interesting result obtained by this experiment was, that on drying the filter and holding it between the eye and the light, it was found to have imbibed a considerable amount of oily matter. The white substance remaining on the filter presented characters similar to those of albuminous or fibrinous matter.

The facts detailed having shown that there was a decided distinction between the serum of a person previous to and after taking food, it became an interesting point to pursue the inquiry, and to ascertain how long the milky aspect would continue in the blood. Accordingly, at six o'clock, P. M., or six hours after the meal, the individual was a third time bled to the extent of seven ounces. The serum was in this case very milky, and threw up, on standing, a considerable white scum to the surface, which could be drawn up by a sucker and examined. On throwing the serum on a filter, a small portion of white matter adhered to it, possessing albuminous characters; the serum passed through with a milky color, but no imbibition of oil could be detected on the filter itself. A careful examination of this specimen of serum could detect not a trace of starch by means of iodine and chlorine, and this led to the investigations detailed in the subsequent parts of this paper.

The inferences deducible from this experiment appear to be,—1st, that the serum of a healthy individual at a certain period of time, after partaking of a meal, is clear and limpid, and corresponds with the description of this fluid as we find it detailed in physiological works of authority; 2nd, that in three hours after a meal, when the food consists of vegetable albuminous matter and oil, or fat, the albumen begins to make its appearance in the blood, while a still larger quantity of fat in relation to the amount of the albumen taken into the stomach exists in the blood; and, 3rd, that in six hours, while the quantity of albuminous matter in the blood can be detected, the fatty matter has comparatively disappeared—a conclusion which is completely in accordance with the chemical properties of these substances, since we know that some kinds of fat liquefy nearly at the temperature of the human body, and will, of consequence, be in a condition immediately after their introduction into the stomach to enter the sanguineous circulation along with the water present in the stomach, since that fluid appears capable of permeating, with great facility, the coats of the intestinal canal throughout its whole length.

To determine the manner in which the food thus passes into the circulating system, is scarcely the province of the chemist. At the same time, since it appears to exist in the current of the blood without having undergone much modification of state from that which it originally possessed in the stomach, there seem no obvious arguments to present themselves against the conclusion that the food is directly absorbed from the alimentary canal by the bloodvessels themselves.

In confirmation of the experiment already detailed, the physiological part of which was conducted by Dr. Buchanan, whose great merits as a physiologist and original observer, require no encomiums from me, various repetitions on the inferior animals were conducted by myself, which it would serve no purpose to enumerate minutely, since they all conducted to the same results.

In the majority of these cases, calves were fed on gruel and milk, and after various intervals they were slaughtered. The serum, on examination, when the animal was killed from three to six hours after the meal, was found to be milky, and to leave a greasy stain on filtering paper when the amount of milk or fatty matter used was considerable; while the serum taken from an animal which had been subjected to starvation for a space of time, varying from twelve to twenty-four hours, presented generally a clear aspect. It has been frequently remarked that the serum of diabetic patients exhibits often a milky appearance, and the circumstance of the co-existence of disease with the white serum was considered as a proof that the disease was the cause of the color of the liquid parts of the blood; but it has been very properly remarked by Dr. Buchanan, that the large amount of food consumed by individuals affected with this disease, affords a satisfactory mode of accounting for the presence of such profuse quantities of albuminous and fatty matter in the blood in such instances. I have recently had opportunities of studying this form of serum through the kindness of Dr. William Thomson, and I have found no reason to conclude that the blood of diabetic patients, so far as its milkiness is concerned, is more diseased than that of healthy individuals after a full meal. It is no doubt highly probable that the blood in these instances remains for a longer time loaded with the white matter than in the healthy state of the organism, and that the appetite may, by continually urging in a new supply of food, thus produce a diminished rate of digestion or assimilation in the circulating system; but the presence of the white matter in the serum it would be erroneous to consider as a symptom of disease, at least in so far as the data entitle us to draw such an inference.

[Further experiments by Dr. Thomson, on the digestion of starch, are given in the Philosophical Magazine, from which the above is taken, but which we have no room for this week.]

THE BOSTON MEDICAL AND SURGICAL JOURNAL.

BOSTON, JULY 2, 1845.

The New Postage Law.—The present No. of the Journal is forwarded to subscribers subject to the new post-office regulations. The weekly Nos., as has before been remarked, will be received free of all postage by subscribers residing not more than 30 miles from Boston, and will be freed from the liability of a higher rate than newspaper postage being charged upon them (as has in some instances heretofore been done) when sent to any distance. In other respects the rates will be the same as formerly. With regard to the monthly series, the price will be lessened to distant subscribers who have heretofore paid 2½ cts. per sheet. The new rates for magazines, &c., for any distance, are 2½ cts. for the first ounce, and 1 for each additional ounce or fractional part. This would make the postage on our monthly, when containing 4 sheets, which weigh 4 ounces, 5½ cts.; and when containing 5 sheets, 6½ cts. This is the most that can be charged. Throughout New England, however, subscribers have been in the habit of paying newspaper postage on the monthly Parts, these Parts being considered, as they in truth are, a certain number of newspapers sent out together. If this rate of postage should be allowed under the new law, monthly subscribers will be placed on the same footing as weekly ones.—On account of the diminution of letter postage, it is hoped correspondents will be more free in their communications for the Journal, bearing in mind, however, that brevity is an important item in papers intended for a work like this.—By a new arrangement of the Post Master General, it is understood that the privilege will be enjoyed by subscribers of paying money to their postmasters for periodicals.

Physical Exercise.—A leading article in the Common School Journal for June 16th, takes up the subject of gymnastic exercises, particularly in the school under the scientific control of David Thayer, M.D., in Boylston Hall, Boston. Mr. Mann, the philanthropic editor, justly appreciates the great value of institutions for developing the muscular system in cities. People are there so thickly mingled that they actually interfere with each other's movements in the crowded streets, in the overstocked houses, and over-filled public schools. Where there is room for out-door exercise, an untainted volume of atmospheric air, plain food and generous sleeping apartments, it is exceedingly rare to find narrow chests, pale faces, distorted shoulders, curved spines and feeble bodies. But in cities, all these misfortunes are found, and they must be met by the science of the times, which has discovered a palliative at least, and in many cases a radical cure, in the gymnasium.

"Through want of opportunities," says Mr. Mann, "and of inducements to action, bodily exercise falls into disuse and disrepute, and manual labor, under all the healthiest influences of the open sky, comes to be regarded as less reputable than in-door and sedentary occupations. With the decline of physical vigor, the natural desire for physical effort ceases; animal spirits are not generated; the body becomes flaccid, the joints loose and the blood grumous, until the only vigor or *vis* which remains is the *vis inertiæ*. The offspring born of such parents inherit their feebleness. In the price current, too, of certain classes of society, clothes are more valuable than health; and children are debarred from taking exercise, because a nice frock is worth more than a rosy cheek, and a soiled jacket is more to be deprecated than a narrow chest. Children must not be allowed to sport in the wet street or on the dewy grass, because boys and girls were made for shoes and stockings, and not shoes and stockings for boys and girls.

"The natural consequence of all this is, a tendency, in cities, to a rapid deterioration of the race. The body shrinks; the limbs droop and pine; the size of the brain diminishes; the only portion of the nature whose power of endurance is increased, is the social and moral part. In most cities, at least, this portion of the man is so strengthened that it can behold the misfortunes of others without pitying them; see poverty without relieving it, and indulge a sentiment of vindictiveness against crime, without the benevolence which would save new victims from the same calamity."

Cotton Mattresses.—Mr. Crosby, of the city of Lowell, is extensively manufacturing beds, of an elegant appearance, from cotton. They have the external finish of hair mattresses, but, besides being equal to any material in use for stuffing a tick, they have an important advantage over all other kinds of beds known to the community, in their cheapness. A general opinion is expressed that they must soon become hard, inelastic, and therefore unfit for the express object for which they were made. Such, however, appears not to be the case. They do not seem to differ essentially in point of re-action, after being laid upon, from hair. To those who have had no opportunity of trying them, this may appear incredible; however, as the proverb says, "the proof of the pudding is in the eating." It is actually surprising that the idea has not been suggested before, that cotton could be used in this way. For economy, it puts even shaved rattan at defiance. In winter, it must be an admirable thing, from being such a non-conductor of caloric. On board of ships and steamers, besides fulfilling the first intention, of furnishing a first-rate sleeping apparatus, each one would become a life-buoy in case of emergency, capable of bearing up a man. Hotels and lodging houses in general should look into this discovery at once, since it will reduce the expense of furnishing such establishments to less than half the present cost, so far as bedding is concerned. In hospitals, especially, in which bedding is always a great annual outlay, arising from the fact that very many beds are necessarily destroyed in consequence of imbibing offensive discharges, &c., these cotton ones will speedily, we apprehend, become an important consideration. This discovery opens a new source of domestic economy, of vastly more importance to the country at large, than could be expressed in a paragraph. Feathers have been rapidly passing out of fashion for years; yet hair is too dear for universal use, a large part of it being imported. Cotton is a product of our own country, to be had in any abundance. Patriotism, economy, utility and personal comfort, therefore, conspire to bring Mr. Crosby's invention into immediate, and, we trust, very general use.

Berkshire Medical Institution.—How rapidly the years revolve! It seems but a few months since we were commenting upon the prospects of the different medical institutions where lectures were given the past season—and before we are aware of the return of another year, a new set of circulars are thickening upon us from the four winds. Among them is the prospectus of the Berkshire Medical College, old enough to begin to think of being called venerable. Ample preparations are making for the accommodation of a large class, as usual. The lecture term will commence on the first Thursday of August, and continue fourteen weeks. If the trustees have any idea of suitably and comfortably seating the whole class, a remodelling of some of the rooms should be at once commenced. There were 145 students last year—too many for the space in which they were daily assembled. With an increase of population, the students in all the professions are correspondingly multiplying, and enlarged facilities, therefore, are imperiously demanded in all the leading schools of medicine.

Castleton Medical College.—Another annual circular of this school has appeared. Very efficient preparations are making for the next course of lectures, commencing, with an energetic and able faculty, on the 4th of August. Much labor and expense have been incurred in procuring specimens and preparations for the museum. On the 6th of June, 1843, a society of alumni was organized, which will be of service to the future interests of the Institution Fifty-five students received degress in 1845, and nine gentlemen were complimented with honorary degrees.

Laporte University.—Although in Illinois, its medical department has established a character for thoroughness, which has the effect of increasing the number of students, annually. The fifth course of medical lectures will open the first Monday in November and continue sixteen weeks. Recently a chair, called *the Institutes of Medicine and Pathology*, was created. The faculty embraces seven professors, besides a demonstrator of anatomy.

Diseases of the Sexual Organs.—Some of the proof-sheets of an essay on this subject, were transmitted from New York, the last week, where it is being stereotyped. By the title-page we perceive that the author is Dr. E. H. Dixon, of that city, who has written much and well on various branches of surgery. The book is designed for popular as well as professional circulation. Those chapters which treat of strictures, gonorrhœa, malignant diseases of the testicle, cancer, &c., together with the surgery of the parts, show a thorough acquaintance with the principles of approved modern practice. There are startling things appearing here and there, which the non-professional student may regard with surprise. We sometimes have doubts about the propriety, and, in fact, the expediency of giving all sorts of readers these expositions of the vices, the frailties and misfortunes connected with a weak moral sentiment.

Hydrocele and fistulæ are particularly well treated of, and the management will meet with the approbation of discreet practitioners. A few weeks more, at farthest, will bring the first edition into market, when Dr. Dixon will receive a further notice. That gentleman's acknowledged ingenuity under trying surgical circumstances, his originality and thorough devotion to the rational principles of medicine, make it imperious to look into the forthcoming production with more than ordinary interest.

Dosing and Drugging.—An anonymous correspondent has sent from New Bedford, Mass., a communication that appeared in one of the public papers of that town, which criticizes, pretty keenly, a public lecture recently delivered there by Dr. Wm. A. Alcott, on what the speaker was pleased to call *dosing and drugging*. Not doubting the assertion that the discourse was not without objections, we do not feel at liberty to transfer the article to the Journal, since it is minus a responsible signer. It is not enough that a communication is signed a "believer in science." We covet the whole of a writer's name under some circumstances, to fall back upon in case of necessity. Dr. Alcott, with a head full of radicalism on physiological subjects, notwithstanding his acknowledged philanthropy and excellence of heart, would be very likely to indulge in no very sparing thrusts against the practice of medicine, if it did not tally precisely with his own peculiar views.

Law of Medicine in Mississippi.—Dr L. Franck was indicted at Natchez for practising and vending medicine without a license. It was decided on the trial, that the act of the Legislature in incorporating the Board of Medical Censors for Adams County, is unconstitutional and void, and consequently the said board never had a legal existence, and no offence, therefore, had or could be given to the State by individuals who practise physic or prescribe medicine, in any way that may suit their own convenience.

Is the Negro subject to Hare-lip?—This may seem to be a question of no importance, and yet we feel desirous to ascertain the truth in the premises. Of the thousands of negroes we have seen in slave and free States, not one, of any complexion, had hare-lip. We have conversed with gentlemen who have resided years in slave States, and their observation coincides with our own. Here and elsewhere, the deformity forces itself upon us, very frequently, but is exclusively confined to the whites. Is this disparity in the races general throughout the United States; and if so, is there a philosophical reason for the difference? We put this inquiry to the profession at large, and very respectfully solicit their attention to it.—*Western Lancet.*

Medical Miscellany.—A new quack medicine is just coming into the vulgar market, with an exceeding hard name, viz., Dr. Folger's *Olosoanian!* No sort of malady can stand before it, according to the testimonials. Some have been cured several times by it.—A Dr. Patterson, recently appointed postmaster of Rome, Geo. has been arrested for theft.—Word comes that cholera is again raging fatally in the East Indies. It also re-appeared at Sheffield, England, on the 12th of May—after an absence of 13 years.—Surgeon J. B. Gould is ordered to the Sloop of War Marion.—Surgeon W. A. W. Spotswood and Passed Assistant Surgeon C. D. Maxwell, to Sloop of War Cyane.. Passed Assistant Surgeon J. O'C. Barclay, to the Philadelphia Navy Yard; Passed Assistant Surgeon J. M. Minor, to the New York Naval Hospital; Assistant Surgeon S. R Addison, to receiving ship at Boston.—Assistant Surgeon C. E. Isaacs, U. S. A., ordered on Army Medical Board for examination of Cadets at West Point, in connection with Assistant Surgeon Henderson and Surgeon Wheaton.

To Correspondents.—An analysis of a Report on the use of large doses of quinine, from the Surgeon General's office; Dr. Leonard on the use of sanguinaria; Dr. Brownell's case of mortification; and a review of a New York Valedictory Address, have been received.

Married,—In Boston, Dr. Abel Ball to Miss E. Child.—At Portsmouth, N. H. Dr. Horatio N. Glentworth, of the Navy, to Miss Caroline Richards.—At Bangor Me., Dr. C. A. Jordan to Mrs. S. D. Cargill.—In Portland, Me., Lemuel N. Rugg, M.D., to Miss Margaret Ann Mason.—In New York, Dr. Charles S. Rowell to Miss E. D. Frazer.—At Philadelphia, Charles Kidder, M.D., of Providence, R. I., to Miss J. Harris.—Dr. John C. Hutton to Miss E. Nutz.

Died,—At Peoria, Illinois, Dr. Hurlburt, a native of Charlotte, Vt.

Number of deaths in Boston, for the week ending June, 28, 38—Males, 24; Females, 14. Stillborn, 7. Of consumption, 8—accidental, 2—scarlet fever, 6—hooping cough, 3—inflammation of the bowels, 2—scrofula, 1—measles, 1—cholera morbus, 1—debility, 1—infantile, 1—erysipelas, 1—liver complaint, 1—teething, 1—typhus fever, 1—lung fever, 1—dropsy on the brain, 1—croup, 1—bowel complaint, 1—drowned, 4.

Under 5 years, 14—between 5 and 20 years, 11—between 20 and 60 years, 10—over 60 years, 3.

On the Frequent Spontaneous Cure of Pulmonary Consumption, and the Indications furnished by Pathology for its Rational Treatment.—Dr. J. Hughes Bennett states, that of seventy-three bodies he has examined since last November, he found puckerings or concretions in the lungs in twenty-eight. They were combined with induration alone in twelve, with cretaceous or calcareous concretions in sixteen. They occurred in the right lung seven times, in the left lung twice, and in both lungs nineteen times. He thinks that these observations, conjoined with those of Roger and Boudet, serve to establish that the spontaneous cure of pulmonary tubercle occurs in the proportion of from one-third to one-half of all the individuals who die after the age of 40. Dr. Bennett observes, that as empirical means for accomplishing a cure have notoriously failed, perhaps a study of the method in which nature operates may be more successful. There seems no reason why cavities in the lungs should not heal with the same frequency as ulcerations or abscesses in other internal organs, if the further deposition of tubercle could be arrested. This is only to be accomplished by overcoming the pathological conditions on which the deposition of tubercle depends. These are—first, a morbid state of the blood, the result of imperfect nutrition; secondly, local inflammation, by means of which an unhealthy exudation is poured out that assumes the form of tubercular or scrofulous matter. The indications for treatment are—1st, To overcome the dyspepsia and acidity in the alimentary canal; 2nd, To furnish the material necessary for the formation of a healthy chyme; and 3rd, To combat the local inflammation. The dyspepsia and vomiting are often to be alleviated by naphtha. He attributes the good effects of this remedy to its power of allaying the irritability of the stomach, and thus enabling the patient to take nourishment. In following the second indication, he now, after four years' employment of it in private, as well as in dispensary and hospital practice, strongly recommends cod-liver oil as a most valuable remedy.—*Edinburgh Medical and Surgical Journal.*

On the Purification of Honey. By M. Veling.—The white of one egg is beaten up with five pounds of honey, till it froths; as much water is then added as is sufficient to form the consistence of a thinnish honey; it is then mixed, and boiled until the albumen can be removed with the froth; it is then poured into an upright vessel, two or three inches above the bottom of which a cock is inserted; it is well covered, and set aside in a cellar for six or eight weeks. The impurities, which otherwise stop up the filter, or the finer portions of which pass through, become coagulated in the vessel, and collect at the bottom and on the sides, and the honey can be drawn off clear by the cock.—*Archiv. der Pharm.*

Adulteration of Saffron.—J. Muller recommends concentrated sulphuric acid as the most certain test for saffron, for it immediately turns the color of pure saffron to indigo blue (it however soon changes to dark red and brown). The leaves of *crocus vernus*, which form the most frequent adulteration, are colored of a dark green by sulphuric acid.—*Ibid.*